

CLAIMS

1. Device for the optical display of n switching states of a switching device or sensor with a plurality of different coloured lighting devices (12) for the optical display of the information to be transmitted, each lighting device (12) having at least one lighting element (20), characterized in that a transparent casing part is provided for receiving the lighting elements (20), that for avoiding optical crosstalk, particularly in the case of simultaneously active lighting elements (20), the transparent casing part (14) is subdivided by optical interfaces (16) into segments (18) in which the lighting elements (20) are received and that the transparent casing part (14) with the segments (18) and lighting devices (12) is so constructed and positioned that the lighting devices (12) are visible by a user from each azimuth angle within a polar angle range.
2. Device according to claim 1, characterized in that in the case of a suitable choice of the switching states, the n -segment display can be reduced to a $n = 1$, $n = 2$ or $n' = n - 2$ displays, the lighting elements being always positioned facing spatial diagonals.
3. Device according to one of the claims 1 or 2, characterized in that each lighting device (12) has at least one lighting element (20), particularly at least one light bulb or LED and/or that in the case of at least one lighting device

(12) a plurality of lighting elements (20) is provided and in particular placed on the printed circuit board and can be arranged in a row and/or in parallel to one another in order to illuminate a lighting segment.

4. Device according to one of the claims 1 to 3, characterized in that the transparent casing part (14) is constructed for terminal and/or central installation on an in particular cylindrical, round or polygonal casing.
5. Device according to one of the claims 1 to 4, characterized in that the lighting devices (12) are visible to the user from any azimuth direction, at least in a space around the display through the dead angle due to the switching device and/or in a specific polar angle range, particularly in a polar angle range between 20 and 180°.
6. Device according to one of the claims 2 to 5, characterized in that the optical interfaces (16) are formed by printed circuit boards (22) and/or planar shaped separations and/or insert parts and/or cables.
7. Device according to one of the claims 2 to 6, characterized in that a printed circuit board (22) equipped with lighting elements (20) can be slid into the centrally or terminally positioned transparent casing part (14).
8. Device according to one of the claims 1 to 7, characterized in

that an outer face (24) of the transparent casing part (14) is at least partly roughened to increase light scattering.

9. Device according to one of the claims 1 to 8, characterized in that the transparent casing part (14) is at least partly coloured to avoid viewing inside the sensor.
10. Device according to one of the claims 1 to 9, characterized in that by diffusion and therefore limiting the optical luminous efficiency the device is constructed for use in explosive-protected zones.
11. Device according to one of the claims 1 to 10, characterized in that for increasing light scattering light scattering pigments are input in a surface-distributed manner, at least zonally, into the material of the transparent casing part (14).
12. Device according to one of the claims 1 to 11, characterized in that for improved leading out of the light, the interior of the transparent casing part (14) is at least partly silvered.
13. Device according to one of the claims 1 to 12, characterized in that the light emission angle (26) for a segment (18) can be limited by cavities (28) introduced in clearly defined manner into the transparent casing part (14).

14. Device according to one of the claims 1 to 13,
characterized in
that the transparent casing part (14) has a plurality of
cable bushings (30), particularly with cable insertion,
e.g. an insertion bevel, more particularly constructed as
part of an optical interface (16).
15. Device according to one of the claims 1 to 14,
characterized in
that the transparent casing part (14) is constructed as a
more particularly tubular plug insert (32).
16. Device according to one of the claims 1 to 15,
characterized in
that the transparent casing part (14) is constructed as a
more particularly compact end termination.
17. Device according to one of the claims 1 to 16,
characterized in
that the transparent casing part (14) is constructed as
part of a sensor casing (34).
18. Device according to one of the claims 1 to 17,
characterized in
that the sensor casing (34) is forked.
19. Device according to claim 18,
characterized in
that the transparent casing part (14) is provided on one
or both fork ends (36).

20. Device according to one of the claims 1 to 19,
characterized in
that the transparent casing part (14) forms the sensor
casing (34).
21. Device according to one of the claims 1 to 20,
characterized in
that further optical interfaces (16) are formed into the
sensor by casting resin.
22. Device according to one of the claims 1 to 21,
characterized in
that the n segments (18) are filled with a random medium,
preferably a sealing or casting compound.
23. Device according to one of the claims 2 to 22,
characterized in
that in at least one of the n segments (18) is provided a
plurality of in particular differently coloured lighting
devices (12).
24. Device according to one of the claims 1 to 23,
characterized in
that at least one of the n segments (18) is constructed as
an optical interface for an external computer means, par-
ticularly as an IR or UV interface for a PC.
25. Device according to one of the claims 1 to 24,
characterized in
that for the clearly defined light transmission from one
segment (18) into another segment (18), the transparent
casing part (14) has at least one optical bridge (23)
which to a limited extent overcouple the light.

26. Device according to one of the claims 1 to 25,
characterized in
that the sensor is constructed as an inductive, optical,
capacitive, ultrasonic, microwave, temperature, fill
level, infrared, ultraviolet, pressure and/or flow sensor
and/or a position sensor, proximity switch or electrical
switching device according to the prior art in industrial
automation technology.
27. Device according to one of the claims 1 to 26,
characterized in
that the transparent casing part (14) is constructed for
use in motor vehicles as part of a hand brake lever, a
gear shift lever, a windscreen wiper lever, a direction
indicator lever, a control button of an air conditioning
system, a mirror adjustment button, a window regulator
button or a sliding roof button.
28. Device according to one of the claims 1 to 27,
characterized in
that the transparent casing part (14) is constructed as
part of a joystick.